PROPOSED BRIDGE REPAIR OF CRANEHILL DRIVE OVER IVY CREEK

CITY OF LYNCHBURG, VIRGINIA

SECTIONS III,IV & V
Prepared by Schwartz & Associates, Inc.
For
City of Lynchburg
Engineer Commission Number 03026

SECTION III

SUPPLEMENTAL SPECIAL CONDITIONS

CITY OF LYNCHBURG, VIRGINIA

Prepared by

SCHWARTZ & ASSOCIATES, INC.
for
City of Lynchburg
1700 Memorial Avenue
Lynchburg, Virginia 24505

INDEX

SECTION III

SUPPLEMENTAL SPECIAL CONDITIONS

3.1 UTILITIES

A. The Contractor is responsible for the protection of all utilities within the right-of-way and shall comply with Title 56, Chapter 10.3 of the Code of Virginia, concerning utilities "Underground Utilities Damage Prevention Act." Contractor shall contact utility owners for exact locations prior to any excavation near utilities. Respective owners of utilities are as follows:

Miss Utility - phone 1-800-552-7001
Television – Adelphia Cable T.V., phone 384-1000
Telephone – Verizon, phone 954-6888
Gas – Columbia Gas of Va., phone 1-800-543-8911
Electric – American Electric Power, phone 1-800-956-4237
Water - City of Lynchburg - Utilities Division, phone 847-1322
Sewer - City of Lynchburg - Utilities Division, phone 847-1322

Construction may require work on private property. When this occurs, it shall be the responsibility of the Contractor to contact the individual private property owner for exact location of underground utilities of services prior to any excavation on the property.

Contractor shall be responsible for cost of any damages to utilities caused by the construction.

B. Some work under this contract may involve interface with overhead high voltage lines. When this is the case, "The Overhead High Voltage Line Safety Act," Title 59.1, Chapter 30 of the Code of Virginia will apply. Before any work involving high voltage overhead lines is anticipated or encountered, the Contractor must first request the Power Company to make safety arrangements to protect his workers and the lines. The actual expense incurred by the Power Company in taking these precautionary measures shall be paid by the person responsible for the work; the City will consider these charges and pay them as "add-on" to the project.

3.2 LAWS AND REGULATIONS

The Contractor shall subscribe to and comply with all Federal, State and Municipal laws governing Workman's Compensation, Social Security, and Income Tax deductions. The Contractor shall obtain all construction permits necessary to perform the work.

A business license is required to work in the City and the following fees apply:

"16 cents per $100 of gross receipts or $30 whichever is greater."

Any questions concerning this fee may be addressed to the Commissioner of Revenue, City of Lynchburg, Virginia.

3.3 DUST, EROSION AND SEDIMENT CONTROL Revised 11-1-2000

All bidders should note the requirements of Section 3.7 of the General Specifications and Standard Drawings.

3.4 LANDSCAPE PROTECTION

Any vegetation, trees, and/or shrubs damaged beyond the construction limits will be the responsibility of the Contractor to provide acceptable compensation to the Owner.

3.5 WATER FOR CONSTRUCTION

Water required for these repairs may be obtained by renting a meter and purchasing water from the City. With the rented meter the City will provide a valve for the contractor's use in obtaining water from a City fire hydrant. The location of the hydrant will be determined by the Engineer. For further information call the City Utilities Department at 847-1322.

3.6 WASTE MATERIAL

A. Care shall be taken during all operations to prevent material from falling onto the railway, roadway or into the waterway. Any debris that falls onto the railway, roadway or into the waterway shall be removed by the Contractor at his expense.

B. Any and all material removed from the project site is hereby classified as waste material.

All waste material removed from the project site by the Contractor (except that which is classified as hazardous waste or contaminated materials) shall become the property of the Contractor and shall be stored or disposed of properly in the City landfill or other approved landfill in accordance with all laws and regulations. If using the City landfill, the material shall be broken or cut into pieces that can easily be compacted by landfill equipment. The Contractor shall obtain a land disturbance permit from the City before beginning work in either landfill.

C. If a landfill other than the City Landfill is used, the Contractor shall provide to the City proof of its approval prior to its usage by the Contractor.

D. By entering into this contract, the Contractor hereby relieves the City, Schwartz & Associates, Inc. and the Engineer of any and all present and future liability resulting from the storage and/or disposal of the waste material.

E. All costs for this disposal of waste material shall be incorporated in other items bid and is not a pay item.

F. The following tipping fees will be assessed at the City Landfill:

$45.00 per ton

3.7 SPECIFICATIONS AND DRAWINGS

A. The Contractor shall keep at the work site a copy of the drawings and specifications including all authorized change orders and shall at all times give the Engineer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In cases of difference between the Contract Documents, the Drawings shall take precedence over the Specifications and the Agreement shall take precedence over the Specifications and the Drawings. In case of discrepancy either in the figures, or in the drawings, in the specifications, the matter shall be promptly submitted to the Owner who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at his own risk and expense. The Engineer shall furnish from time to time such detail drawings and other information as he may consider necessary, unless otherwise provided.

B. Discrepancies and Errors: Should the Contractor discover any discrepancies between the Drawings and Specifications and the site conditions or any errors or omissions in the Drawings or Specifications, he shall at once report them to the Engineer, but he shall not be responsible for their existence or discovery. However, if the Contractor proceeds with any work that may be affected by such discrepancies, errors or omissions, after their discovery but before their correction, such work shall be at the Contractor's risk.

C. Copies Furnished: Except as provided for otherwise, all copies of Drawings and Specifications reasonably necessary for the execution of work shall be furnished to the Contractor without charge.

D. Ownership of Drawings and Specifications: All Drawings and Specifications and copies thereof furnished by the Engineer are his property and shall not be used on other projects. Upon completion of the project, all copies of the Drawings and Specification except the signed contract sets shall be returned to the Engineer.

3.8 CLAIMS FOR EXTRA COST

If the Contractor claims that any instructions, by drawings or otherwise, involve extra cost under this contract, he shall give the Engineer written notice thereof within fifteen days after the receipt of such instructions, and in any event before proceeding to execute the work, (except in emergency endangering life or property) and the procedure shall then be as provided for Changes in Work. No such claim shall be valid unless so made.

3.9 SUPERINTENDENCE BY CONTRACTOR

The Contractor shall give his personal superintendence to the work or have a competent superintendent, satisfactory to the Contracting Officer, on the work at all times during progress, with authority to act for him. This person should be named at the Pre-Construction Conference and be made available 24 hours a day in case of emergency (emergency phone number).

3.10 SANITARY PROVISIONS

The Contractor shall provide and maintain such sanitary accommodations for the use of his employees and those of his subcontractors as may be necessary to comply with the requirements and regulations of the local and state departments of health, and as directed by the Engineer.

3.11 PUBLIC CONVENIENCE

The Contractor shall at all times so conduct his work as to insure the least possible inconvenience to the general public and the residents in the vicinity of the work. Fire hydrants on or adjacent to the work shall be kept accessible to fire fighting equipment at all times. Temporary provisions shall be made by the Contractor to insure the proper functioning of all gutters, sewer inlets, drainage ditches, and irrigation ditches, which shall not be obstructed except as approved by the Engineer. The Contractor shall, at all times, exercise good housekeeping practices to maintain the project in a neat and orderly manner.

3.12 RECORD DRAWINGS

Red line as built drawings shall be provided by Contractor for Engineer to submit to City upon project completion. To be reviewed each month at time of request for payment. (This is a new City standard policy).

3.13 SHOP DRAWINGS

3.13.1 The term "shop drawings", as used herein shall include fabrication, erection and setting drawings, manufacturers' standard drawings, schedules, descriptive literature, catalogs, brochures, performance and test data, and all other descriptive data pertaining to the materials and equipment as required to demonstrate compliance with the contract requirements.

3.13.2 The Contractor shall submit for the review of the Engineer all shop drawings required by the specifications or requested by the Engineer. All such submissions shall be made with such promptness as to cause no delay in this or any other contract on the project, and to allow reasonable time for checking.

3.13.3 Shop drawings shall be submitted in such number of copies that two copies may be retained by the Engineer. Each submission shall be accompanied by a letter of transmittal in duplicate, listing the contents of the submission and identifying each item by reference to specification section or drawing. All shop drawings shall be clearly labeled with the name of the project and other necessary information. Catalog plates and other similar material that cannot be so labeled conveniently, shall be bound in suitable covers bearing the identifying data.

3.13.4 Shop drawings shall be accompanied by all required certifications and other supporting material and shall be submitted in such sequence or in such groups that all related items may be checked together. When shop drawings cannot be checked because the submission is not complete, or because shop drawing on related items have not been received, then such shop drawings will be returned without action or will be held, not checked, until the lacking material is received.

3.13.5 Shop drawings shall have been reviewed by the Contractor and coordinated with all other related or affected work before they are submitted for approval, and shall bear the Contractor's certification that he has checked and approved them as complying with the information given in the Contract Documents. Shop drawings submitted without such certification and coordination will be returned to the Contractor without action, and will be considered not a formal submission.

3.13.6 The General Contractor and his subcontractors must submit in writing any requests for modification to the plans and specification. Shop drawings that are submitted to the Engineer for his review do not constitute “in-writing” unless it is brought to the attention of the Engineer, in a cover letter, that specific changes are being suggested and changes listed in cover letter. In any event, changes to the plans and specifications by means of shop drawings become the responsibility of the party initiating such changes.

3.13.7 The Engineer shall pass upon the shop drawings with reasonable promptness. Checking and/or review of shop drawings will be general, for conformance with the design concept of the Project and compliance with the information given in the Contract Documents, and will not include quantities, detailed dimensions, nor adjustments of dimensions to actual field conditions. Review shall not be construed as permitting any departure from contract requirements, authorization of any increase in price nor as relieving the Contractor of the responsibility for any error in details, dimensions or otherwise that may exist.

DIVISION IV

REVISIONS TO VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS, 2002

CITY OF LYNCHBURG, VIRGINIA

Prepared by

SCHWARTZ & ASSOCIATES, INC.
for
City of Lynchburg
1700 Memorial Avenue
Lynchburg, Virginia 24505

SECTION IV

SPECIAL PROVISIONS AND REVISIONS TO
VIRGINIA DEPARTMENT OF TRANSPORTATION
ROAD AND BRIDGE SPECIFICATIONS, 2002

1.01 HYDRAULIC CEMENT CONCRETE

1. Testing - Section 404 of 2002 Virginia Department of Transportation (VDOT) Road and Bridge Specifications is changed in regard to testing and all testing of concrete shall be as detailed below.

a. All material shall be shipped from stockpiles approved by VDOT. A notarized letter of certification from the concrete supplier stating that all materials used in the concrete mix and the overall mix meet all requirements of the specifications and the special provisions shall be provided. All mix designs shall be submitted to the Engineer for his review.

b. Change of Supply Tests - If during the course of this project, the Contractor desires to change his source of supply of fine or coarse aggregates, or both, he shall secure the services of an approved laboratory and have the tests prescribed by the VDOT specifications performed and new design mixes prepared, and submit them to the Engineer for review a minimum of fifteen (15) days before placing concrete. Payment for all change of supply tests shall be made by the Contractor.

c. Job Tests - The Engineer may reject any shipment of concrete which in his opinion, does not meet the VDOT specifications, or these specifications.

The Engineer, at any time, may require the contractor to have an approved laboratory perform the prescribed tests on the materials being used. If the material meets the specifications then the OWNER shall bear all expense of the tests, otherwise such tests shall be at the Contractor's expense, and all concrete placements shall stop until satisfactory materials are obtained. The Engineer shall have the Contractor's assistance in performing all job tests deemed necessary by the Engineer.

d. Cement Mill test - the cement company supplying Hydraulic cement to the project shall furnish to the Engineer for each car of cement, two copies of the certified mill test reports.

e. Concrete Test Cylinders - During the progress of the work, the Engineer at his discretion, may require that concrete test cylinders be taken at various intervals.

The cylinders will be taken by the Engineer with the Contractor's assistance.

Curing and testing of cylinders will be as directed by the Engineer. The Contractor shall furnish the materials for concrete cylinders at his expense.

1.02 EPOXY

1. Materials - Material for epoxy resin systems shall conform with Section 243 of 2002 VDOT Road and Bridge Specifications. A letter of certification shall be required stating that epoxy meets all requirements of the VDOT specifications. The letter must show epoxy manufacturer name, VDOT system (EP-4, EP-5, etc.), batch numbers and expiration date of epoxy. In the event this specific type of epoxy to be used is not specified on the plans, the type selected for use shall be submitted in writing to the ENGINEER and shall be subjected to his review prior to use.

Containers shall be identified as "Component A-- Contains Epoxy Resin" and "Component B--Contains Hardener" and shall show the type, class and mixing directions. Each container shall be marked with the name of the manufacturer, the class, batch or lot number, the date of packaging, the date of shelf life expiration, pigmentation, if any, and the quantity contained therein in pounds (kg) and gallons(l). Potential hazards shall be so stated on the package in accordance with the Federal Hazardous Products Labeling Act with the following warning:

CAUTION:

Epoxies will cause dermatitis if proper precautions are not followed. Avoid contact with the skin and eyes, use gloves and protective creams on the hands. In the event of contact, wash thoroughly with soap and water. Goggles should be used to protect the eyes; however, in the event of eye contact, flush with water for ten (10) minutes and secure immediate medical attention.

Containers not marked as required above are not to be opened and used.

1.03 PAINT

1. Materials - Materials for paint shall conform to Section 231 of the 2002 VDOT Road and Bridge Specifications. A letter of certification shall be required stating that paint meets all requirements of the VDOT specifications and the cans shall be stamped with VDOT approval stamp, name of material, lot number, VDOT Specification paint number and Federal color number, quantity contained therein, name and address of manufacturer.

1.04 ASPHALT CONCRETE (TYPE SM-9.5 & BM 37.5)

1. Materials - Material for Asphalt Concrete (Type SM-9.5 & BM 37.5) shall be in accordance with VDOT Specifications. Contractor shall submit a mix design, for the Engineer's approval, a minimum of fifteen (15) days before placing wearing surface. A letter of certification shall be required stating that asphalt concrete meets all requirements of the VDOT specifications.

1.05 MATERIALS - GENERAL

The Contractor shall provide the Engineer certifications for all materials used in these bridge repairs. These certifications shall give manufacturer's name and address, name of material, VDOT Model No., Batch Number, Federal Color Number (if paint), VDOT Paint Number, quantity contained therein and shall be delivered to the Engineer's office a minimum of five (5) work days before material is to be placed. The certifications shall state that the material meets all the requirements of these Specifications and shall be signed by the Contractor and notarized. Unless otherwise approved by Engineer, all samples taken for testing shall be taken at the manufacturer's plant.

1.06 MISCELLANEOUS NOTES

1. Section 101 Virginia Department of Transportation or Department shall be deemed to mean the City of Lynchburg

2. SECTION 102.04(a) REQUIRED ATTENDANCE OF PRE-BID MEETING of the Specifications is amended to include the following:

Prospective Bidders are hereby advised that attendance of the Pre-bid Meeting is a prerequisite for submitting a bid proposal for this project. The "Notice of Advertisement for Bids" will designate the date, time and location of the Pre-bid Meeting for interested parties. Prospective Bidders shall register in writing with the Engineer at the Pre-bid Meeting and all attending parties will be noted in the Pre-bid Meeting letter. Failure on the part of the Prospective Bidder to attend the Pre-bid Meeting for this project and to register with the Engineer will be cause for the rejection of the Bidder's proposal.
4-1-87c

Reissued 8-1-91 Reissued 11-1-94

3. SECTION 102.04 (d) EXAMINATION OF SITE OF WORK AND PROPOSAL of the Specifications is amended to replace the first sentence of the third paragraph with the following:

In the event a word, phrase, clause, or other portion of the plans, specifications, or other contract documents is alleged to be ambiguous, the Bidder shall submit to the Contract Engineer a written notice of same prior to the date of receipt of bids, and request an interpretation thereof. 8-1-91 Reissued 11-1-94

4. 105.01 PHASE INSPECTION: The Contractor is hereby advised that the work on this project will be inspected under the Phase Inspection concept at critical stages; however, all stages of the work are subject to inspection.

Prior to beginning operations, the Engineer will meet with the Contractor to establish an understanding of the critical stages of work which will require the presence of an Inspector. The Contractor shall keep the Department informed, in a timely manner, of planned or contemplated operations on a continuing basis.

When an inspection reveals that work has not been properly performed, the Contractor will be so advised and he shall immediately inform the Department of his schedule for correcting such work, as well as the time at which a reinspection of such work can be made.

4a. 105.10 Construction, Stakes, Lines & Grades:

October 23, 1992c
Reissued November 1, 1994

SECTION 105.10 of the Specifications is replaced by the following:

Section 105.10 Construction Stakes, Lines and Grades - This work shall consist of providing the necessary surveying and stakeout for the successful prosecution of work. Stakeout work shall be in accordance with the provisions herein and the Department's current Survey Manual, applicable requirements of which are contained herein. Except as specified herein, references throughout the Specifications which imply that the Engineer will provide construction lines and grades shall be interpreted to mean that the Contractor shall provide such construction lines and grades.

The location of any reference points, which may have been established by the Department, and any control data, which the Department may have, will be made available to the Contractor upon request. The Department will be responsible for the accuracy of such reference points and control data.

The following surveying work shall be performed by or under the direct supervision of a Surveyor who is licensed in Virginia as a Land Surveyor or Professional Engineer: (a) All horizontal and vertical controls for bridges, and (b) Location and stakeout for right-of-way monuments. The Contractor shall provide the Engineer with a copy of all surveying field notes and computations at least 10 days prior to the use of said stakeout information for construction. Consideration will not be given for any delays to the project which result from inaccurate stakeout or time lost for corrective action.

The Contractor shall stake box culverts and culverts with design grades. The Contractor shall locate, in red pencil, the staked reference points for culverts on the Project Inspector's plans prior to beginning work on the staked culverts. In lieu of marking the plans, the Contractor may provide a detailed sketch of the referenced points.

The Contractor shall set stakes at the intersection of the baseline of bridge and centerline of each pier, and on the baseline of bridge at intersection of lines shown on plans for abutments from which dimensions are referenced. Intersection points are shown on the sub-structure layout sheet of bridge plans. Angles shall be turned to the centerline of all piers and lines shown on the plans for abutments from which dimensions are referenced, and stakes shall be set on the bridge baselines or these centerlines. The Contractor shall set stakes at 50 ft. intervals or less to locate the toe of fill or cut in front of the abutments.

Within 5 calendar days after completing the bridge stakeout and thoroughly checking the same, the Contractor shall furnish the Engineer two bridge layout plan sheets on which the Contractor's Survey Supervisor has located all points which have been staked. At the time of furnishing the marked layout sheets, the Contractor or the Contractor's Survey Supervisor shall meet with the Engineer to review the layout.

The Contractor shall set hub and tack points for RM-1 right-of-way monuments in accordance with the Standard Drawings. The Contractor shall furnish RM-2 right-of-way monuments and locator post; however, the Department will furnish the required caps for installation by the Contractor. Locating and setting RM-1 and RM-2 right-of-way monuments will be measured and paid for in accordance with Section 503 of the Specifications.

Construction surveying will be paid for at the contract lump sum price, which price shall be full compensation for performing required construction survey work, and for marked layout sheets, computations and survey notes.

Payment for Construction surveying, not to exceed the contract price bid, will be made upon written request by the Contractor. Such request shall be submitted to the Engineer no earlier than five days and no later than two days prior to the progress estimate date. Payment may be made in increments selected by the Contractor not to exceed 90% of the contract unit price bid until the Contractor has provided the Engineer with layouts, computations and survey notes.

Payment will be made under:

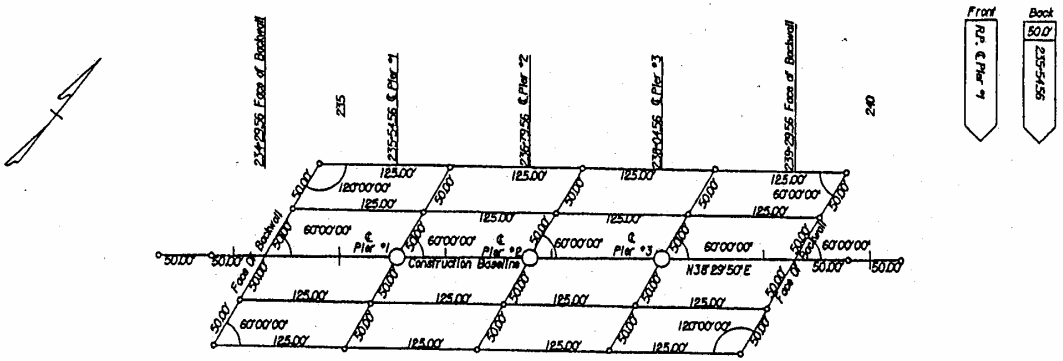
Pay Item	**Pay Unit**
Construction surveying	Lump sum

SAMPLE

March 2001

Benchmark #1 - 3 Nails Set In The Base Of A 36" Oak, 85' Lt. Of Sta. 232+00 Construction Baseline
Elevation - 433.98

Benchmark #2 - Railroad Spike Set In The Top Of A 48" Stump, 105' Rt. Sta. 240+50 Construction Baseline.
Elevation - 429.22



Note:

1. At Least Two Offset Points Shall Be Set On Each Side Of The Abutments And Piers.
2. Offsets When Possible Will Be Set Equal Distance From Backwall And Piers.
3. Angles And Distances Shall Be Checked At Ends Of All Offset Lines.
4. A Minimum Of Two Benchmarks Shall Be Set In The Immediate Vicinity Of The Bridge. The Descriptions And Station And Offset From The Construction Baseline Shall Be Shown On The Bridge Stake Out Sketch.
5. All Bridges Should Be Staked By One Field Crew And This Stake Out Verified By Another Field Crew Prior To Submittal Of This Sketch.
6. All Reestablishing Of Face Of Backwall And Centerlines Of Piers Will Be By Intersection Only. Distances Are Provided For Checking Purposes Only.

Certification

I, Licensed Land Surveyor, Hereby State The Stake Out Of Bridge #_____, Project# _____ Was Conducted Under My Direct Control or Personal Supervision And This Sketch Correctly Represents The Location Of All Offset Points Staked In The Field.

_____ _____ _____
Land Surveyor Reg.# Date

FIGURE 3

5. SECTION 107.01 LAWS TO BE OBSERVED of the Specifications is amended to include the following:

In accordance with Article 2.1 of Chapter 7 of Title 11 of the Code of Virginia (Virginia Public Procurement Act), the Contractor shall make payment to all subcontractors, as defined in the Code, within seven days after receipt from the Department; or, shall notify the Department and subcontractor in writing of the intention to withhold all or a part of the amount due along with the reason for nonpayment.

In the event payment is not made as noted, the Contractor shall pay interest at the rate of 1 percent per month, unless otherwise provided in the contract, to the subcontractor on all amounts that remain unpaid after seven days except for the amounts withheld as provided hereinbefore.

These same requirements shall be included in each subcontract and shall be applicable to each lower-tier subcontractor.
5-3-90 Reissued 8-1-91 reissued 11-1-94

6. SECTION 202 FINE AGGREGATE of the Specifications is amended to revise Table II-I with the following:

TABLE II-1
Fine Aggregate

Amounts Finer Than Laboratory Sieve (Square Opening) (% by Weight)								
Grading	3/8 in. (9.5mm)	No. 4 (4.75 mm)	No. 8 (2.36 mm)	No. 16 (1.18 mm)	No. 30 (600 µm)	No. 50 (300 µm)	No. 100 (150 µm)	No. 200 (75 µm)
A	Min. 100	97±3	90±10	67±18	42±17	17±9	Max. 10	
B	Min. 100	97±3					Max. 10	
C		Min. 100	97±3				Max. 25	
F	Min. 100	92±8	80±20	62±22	39±19	Max. 26	Max. 10	Max. 7
G	Min. 100			70±30	50±35	Max. 26	Max. 10	Max. 5

2-2-98

7. SECTION 214.02 (a) BLENDED HYDRAULIC CEMENT of the Specifications is replaced with the following:

a. Blended hydraulic cement shall conform to the requirements of AASHTO M240, Type I (P) or Type I (S). 12-10-96

TABLE II-17
Requirements for Hydraulic Cement Concrete

Class of Concrete	Design Min-Laboratory Compressive Strength at 28 days (f'_c) (psi)	Aggregate Size No.	Nominal Max. Aggregate Size (in)	Min. Grade Aggregate	Min. Cement Content (lb/cu yd)	Maximum Water (lb water/ lb cement)	Consistency (in of slump)	Air Content (%)
A5 Prestressed and other special designs[2]	5,000	57 or 68	1	A	635	0.40	0-4	4.5±1.5
A4.5 General	4,500	57	1	A	635	0.40	3-6	6.5±1.5
A4 General	4,000	57	1	A	635	0.40	3-6	6.5±1.5
A4 Posts & rails[3]	4,000	7	1/2	A	635	0.40	3-6	7±2
A3 General	3,000	57	1	A	588	0.40	3-6	6±2
A3 Paving	3,000	57	1	A	564	0.49	0-3	6±2
B2 Massive or lightly reinforced	2,200	57	1	B	494	0.58	0-4	4±2
C1 Massive unreinforced	1,500	57	1	B	423	0.71	0-3	4±2
T3 Tremie seal	3,000	57	1	A	635	0.49	3-6	4±2
Latex hydraulic cement concrete[4]	3,500	7 or 8	1/2	A	658	0.40	4-6	5±2
Silica fume concrete	5,000	7 or 8	1/2	A	658[5]	0.40	4-7	6±2

Table II-17 Continued

1 When a high-range water reducer is used, the target air content shall increased 1% and the slump shall not exceed 7 inches.

2 When Class A5 concrete is used as the finished bridge deck riding surface, or when it is to be covered with asphalt concrete with or without waterproofing, the air content shall be 5.5+1.5%.

3 When necessary for ease in placement, aggregate No. 7 shall be used in concrete posts, rails, and other thin sections above the top of bridge deck slabs.

4 The latex modifier content shall be 3.5 gallons per bag of cement.
Slump shall be measured approximately 4 1/2 minutes after discharge from the mixer.

5 Minimum 7% silica fume replacement by weight of the total cementitious material.

Note: The Contractor may substitute a higher class of concrete for that specified at his expense.

8. SECTION 217.06 – CLASSIFICATION OF CONCRETE MIXTURES

Classes & uses of concrete & proportions in mixtures are revised as shown in Table II-17.

9. SECTION 217.07 of the Specifications is amended as follows:

In all structural concrete the water/cement ratio shall not exceed 0.40, maximum slump of concrete upon arrival at construction site shall not be less than 3" and shall not exceed 6". All concrete with a 0.40 water/cement ratio shall contain a superplasticizer, such as Master Builder's Polyheed, conforming to ASTM C 494, Type F and added at the concrete plant as part of the batch procedure.

10. SECTION 217.09 of the Specifications is amended as follows:

Structural concrete (any concrete used in bridge structures) temperature, at time of placement, shall not exceed 80 degrees F. Concrete decks shall be placed between 10:00 pm & 5:00 am the next day. The bridge shall be closed ,to traffic, for all deck placements from 10:00 pm until 12:00 noon the following day.

The concrete producer shall have on-site at the concrete plant a VDOT certified concrete technician (current) who will test every load of structural concrete (concrete to be used in the bridge structures) prior to its leaving the plant site. All tests required on the form, Page IV-11, shall be performed by the technician and the results listed and the form signed by the technician. Each test result shall be within the specification range allowed in order for shipment to the project site to be allowed. A ticket showing the actual batch weights of the material used in concrete shall be delivered to the site with each load of concrete.

This completed and signed form shall be sent to the project site with each load of structural concrete shipped. Failure to provide this completed form or the delivery ticket shall be cause for rejection of the concrete shipment.

CONCRETE PRODUCER TESTS

Producer_____ Project_____

Date_____ Load No._____

Truck No._____

1. Moisture Contents:

   Fine Aggregate _____ Date Tested_____

   Coarse Aggregate _____ Date Tested_____

2. Temperature at Time of Testing Concrete

   Air _____ degrees F

   Concrete _____ degrees F

3. Air Content - _____ %

4. Slump - _____ inches

5. Gallons of Water Withheld at Plant _____

6. Actual Water/Cement Ratio _____

Signed: _____
VDOT Certified Concrete Technician
(Certification Expiration Date _____

NOTE: Aggregate moisture tests shall be performed daily, prior to batching concrete.

11. SECTION 221.02 DETAIL REQUIREMENTS of the Specifications is amended to add the following:

(h) Offset block shall conform to either of the following:

1. Steel conforming to the requirements of ASTM A36 and shall be galvanized in accordance with ASTM A153.

2. Wood conforming to the requirements of Section 236 and shall be pressured treated.

3. Recycled material - Offset blocks shall be made from a minimum of 40% recycled plastic waste. Such plastic shall be accumulated from post consumer and post industry waste. The material for these blocks shall have a minimum specific gravity of 0.950. The minimum compressive strength of these blocks in the lateral dimension shall be 1600 psi. The maximum water absorption allowed over the theoretical lifetime of the block shall not exceed 5% by weight, when tested in accordance with ASTM D1037. Block attachment shall be in accordance with the Standard Drawings for wooden posts, standard GR-2, 2A W-Beam guardrail. The size tolerance in the direction of the bolt hole shall not be more than + 1/4 inch. The blocks shall conform to the dimensions and tolerances listed on the Standard Drawings.

The manufacturer of the recycled plastic blocks must provide independent test results showing the material meets the velocity, acceleration and post-impact trajectory requirements of National Cooperative Highway Research Program (NCHRP) Report 350.

The manufacturer shall also certify that the material components of the completed blocks are resistant to the Subterranean Termites during its theoretical lifetime when tested in accordance with ASTM D3345. The theoretical lifetime is considered to be at least 20 years. 1-26-94c Reissued 11-1-94

12. SECTION 401.03 (b) DEPTHS OF FOUNDATIONS of the Specifications is amended to replace the second & fourth paragraphs with the following:

When requested, the Contractor shall explore foundations by rod soundings or drillings to determine, to the satisfaction of the Engineer, the adequacy for the foundation to support the structure. If explorations indicate that satisfactory foundations can be obtained, variations from plan depths to foundations of open column abutments and solid or column piers shall be made only by adjusting stem lengths. Footing depths shown on the plans shall be considered minimum depths. Plan depths of concrete for footing may be increased not more than 24 inches at points of local irregularity over solid rock foundations.

If explorations reveal that foundations or subfoundations are inadequate for the structure, or are not within the limits or permissible variation from the bottom of footing elevations, the Engineer shall be consulted for instructions for further action or redesign.
5-5-94 Reissued 11-1-94

13. SECTION 404.03 (h) of the Specifications is expanded to include the following:

Wherever called for on the Drawings, concrete construction joints shall be bonded with a bonding epoxy. This bonding epoxy shall be SIKA ARMATEC 110 (or Engineer approved equivalent) unless otherwise noted on the Drawings.

14. SECTION 404.03 (k) of the Specifications is expanded to include the following:

Cure all structural concrete for a minimum of 7 days and until 70% f'c is achieved using all of the following:

A. Curing compound.
B. Wet, well drained burlap and white polyethylene. Burlap shall conform to the requirements of AASHTO M182, Class 3 (min. weight of 10 oz. per sq. yd and a minimum number of eleven (11) threads of burlap per inch).

C. Use perforated garden hose to keep burlap wet.

All forms used in placement of structural concrete shall remain in place, undisturbed, for a minimum of seven (7) full days after concrete placement.

15. SECTION 404.03 (l) 1. WEATHER of the Specifications is amended to replace the last sentence of the fourth paragraph with the following:

The Engineer will perform evaporation rate testing for superstructure concrete or bridge overlay placements. If the maximum evaporation rate, as determined from Figure I of Page 06010-13 exceeds 0.1 lb/sq ft/ hr for A4 concrete superstructure concrete placements or 0.05 lb/sq ft/hr for latex modified concrete overlays and other hydraulic cement overlays, the Contractor shall not place the superstructure concrete (for decks, sidewalks, median barriers, or parapets or rails), latex modified concrete overlay or other hydraulic cement overlay.

All deck, parapet & sidewalk placements on structure shall take place between 10:00 pm & 5:00 am.

In the event plastic shrinkage cracking occurs, the Contractor shall make repairs by epoxy injection, concrete removal and replacement, or other methods satisfactory to the Engineer and at the Contractor's expense.

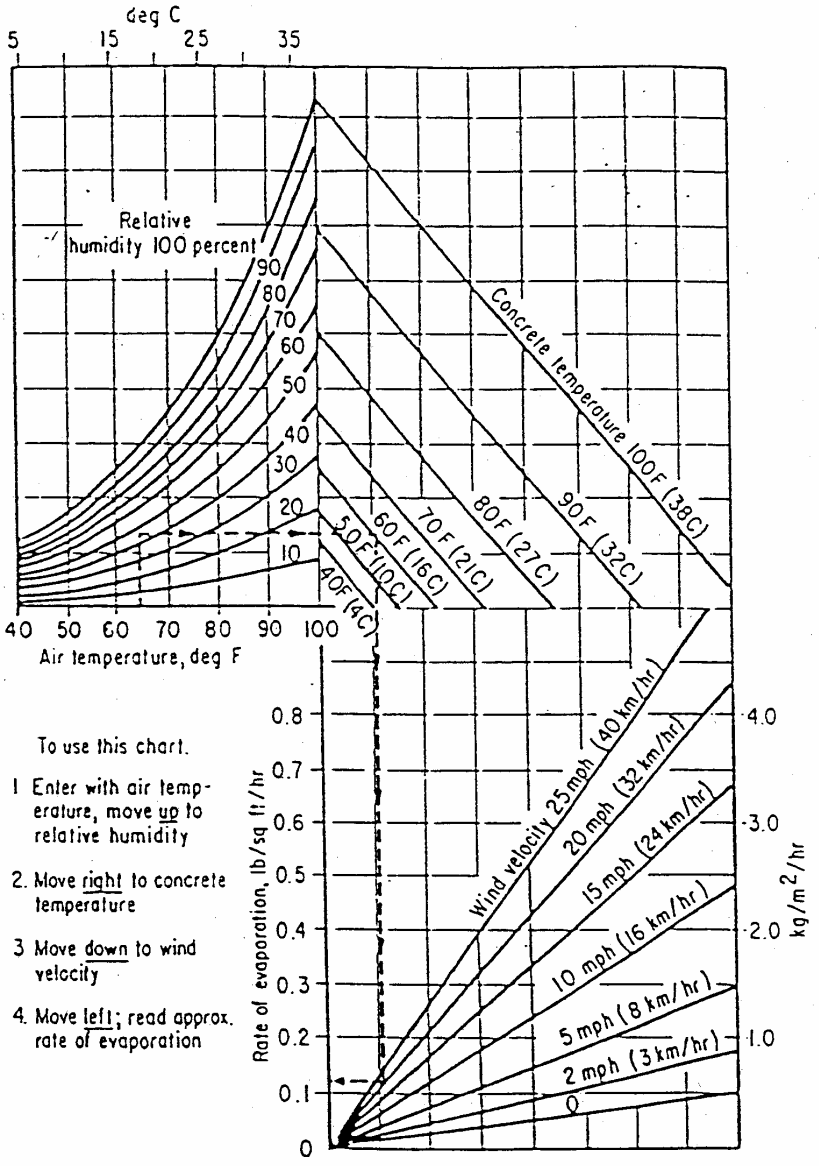


FIGURE 1

EFFECT OF CONCRETE AND AIR TEMPERATURES, RELATIVE HUMIDITY, AND WIND VELOCITY ON THE RATE OF EVAPORATION OF SURFACE MOISTURE FROM CONCRETE. THIS CHART PROVIDES A GRAPHIC METHOD OF ESTIMATING THE LOSS OF SURFACE MOISTURE FOR VARIOUS WEATHER CONDITIONS. TO USE THE CHART, FOLLOW THE FOUR STEPS OUTLINED ABOVE.

16. SECTION 404.05 (d) WATERSTOPS is completely replaced by the following:

All waterstops detailed in these specifications (and/or as shown on the contract drawings) shall be manufactured from virgin polyvinyl chloride plastic compound that has a tensile strength greater than 2,000 PSI, and shall not contain any scrap or reclaimed material or pigment whatsoever.

Waterstops, when being installed, shall be cut and spliced at changes in direction as may be necessary to avoid buckling or distortion of the web or flange.

To ensure proper placement, all waterstops shall be fastened every 12 inches (both sides) prior to concrete placing. Manufacturer's shop splices shall be fully vulcanized.

All field splices shall be heat fused, and the splices shall be tested for a complete seal by use of a corona discharge unit. Zero water leakage shall be proven through use of the American Concrete Institute (ACI) standard test method for waterstops.

If, after placing concrete, waterstops are out of position or shape, the surrounding concrete shall be removed, the waterstop reset, and the concrete replaced, all at the Contractor's expense.

The properties of the polyvinyl chloride compound used, as well as the physical properties of the waterstops, shall exceed the requirements set forth in the U.S. Army Corps of Engineers waterstop specification (CRD-C572-74).

17. SECTION 413.02 (b) PROCEDURES of the Specifications is amended to add the following:

Portion of the existing structure (material removed) shall become the property of the Contractor and shall be removed from the project and disposed of properly.

INDEX

SECTION V

SPECIAL PROVISIONS

SECTION V
SPECIAL PROVISION I 1-14-04
MOBILIZATION

A. - GENERAL

Mobilization shall meet all requirements of Section 513 of the VDOT Road and Bridge Specifications.

Access to Property Off the Right-of-Way The successful Contractor shall contact all adjacent property owners of this project and obtain their permission to enter their property, if needed, in order to gain access to the work site. It will be the successful Contractor's responsibility to contact the individual property owners and work out details for constructing temporary access roads to this portion of the site and to remove these temporary access roads, at the completion of the project, to the satisfaction of the property owners. The Contractor will be required to provide the City with copies of the written agreements, which must exist with each property owner, and a Letter of Release from each property owner upon completion of the work with the Release stating that the property owner is satisfied that their property has been restored to their requirements.

B. – BASIS OF PAYMENT

This is not a separate pay item, therefore no measurement for payment will be made. All costs incurred from activities resulting from this item shall be included in Lump Sum price bid for "Mobilization."

PART 1 - GENERAL

1.01 DESCRIPTION

This work shall consist of maintenance & protection of pedestrian & vehicular traffic through or around areas of construction. It shall include: covering & uncovering existing signs, furnishing, erecting & maintenance of new construction signs, sign posts; Flags, Group 2 channelizing devices, Type III Barricades, drums, eradication of existing pavement markings, placement & removal of temporary pavement markings, temporary message markings, 24" stop bars and all other items used for traffic maintenance ,as required, by the Contract Drawings, Project Manual and the Virginia Work Area Protection Manual. It also includes: the furnishing of flagmen, lights, vertical panels, illuminated flashing or sequential amber arrows, and truck mounted attenuators. At the completion of this project ,the construction signs & sign posts shall be removed by the Contractor and shall remain the property of the Contractor. This item also includes all costs associated with lighting & barricading the work areas from pedestrians & motorists according to the plan developed by the CONTRACTOR and approved by the ENGINEER.

It shall also include: Furnishing, erecting, maintaining & dismantling of two (2) poles with guys as necessary to be used to support Contractor provided, installed, energized, maintained & removed two (2)traffic signals, and four (4) temporary power poles with guys as necessary to be used to support City power lines, as required by the Contract Drawings, VDOT Standards and Specifications and Project Manual.

In addition, it shall include all costs associated with providing, at all times, safe pedestrian access to all business and residences within the limits of the signs erected for the project.

All work shall be scheduled and performed, in such a manner, as to provide a minimum of interference and maximum protection to traffic and workmen. In no case shall traffic be stopped for more than five (5) minutes at a time.

The Contractor will be given a marked up sheet (in color) showing approximate location for pavement line eradication, temporary pavement line markings, message markings and stop bars ,prior to mobilization. The City will furnish and install final pavement markings.

The CONTRACTOR shall take adequate precautions to prevent material, sand or other debris from being spilled, blown, or tracked onto traveled roadways (including creek) throughout the duration of this project. Should any material get onto a traveled roadway or creek, the CONTRACTOR shall immediately stop work and have it removed. The ENGINEER may stop work, if conditions warrant, due to blowing sand.

The CONTRACTOR shall notify the City Traffic Engineer ten (10) days (minimum) prior to installing the traffic control, in order for the City to put out a press release concerning this project.

1.02 METHOD OF MEASUREMENT

"Maintenance of Traffic" will be paid for on a "Lump-Sum" basis wherein no measurement will be made.

1.03 BASIS OF PAYMENT

Maintenance of traffic will be paid for at the Contract "Lump-Sum" price, which price shall be full compensation for: covering & uncovering existing signs, furnishing, installing, erecting, maintenance & removal of new construction signs, traffic signals (and all associated equipment, energy, etc., required to make traffic signals fully operational) signal light poles, temporary power poles, guy wires, sign posts, vertical panels, flags, Group 2 channelizing devices, Type III Barricades, drums, lights, illuminated flashing or sequential amber arrows, truck mounted attenuators and all costs for flagmen. It further includes: eradication of existing pavement markings, placement & removal of temporary pavement markings, message markings and 24" stop bars. Also, included is: lighting & barricading the work area from pedestrians & motorists; providing safe pedestrian & motorists access to all businesses & residences; and for all materials, labor, tools, equipment & incidentals necessary to complete the work. Payment will be made under the Contract pay item:

"MAINTENANCE OF TRAFFIC" - Pay unit will be on a "Lump-Sum" basis.

SECTION V

SPECIAL PROVISION III

WATERPROOFING FABRIC

I. DESCRIPTION:

This material shall be used to seal construction joints to prevent the passage of water through sections of hydraulic cement concrete in areas of the bridge substructure. The waterproofing membrane sealant shall consist of a prefabricated membrane bedded in a bonding epoxy.

II. DETAIL REQUIREMENTS:

A. Fabric shall conform to the requirements of AASHTO M117 if cotton fabric is used and shall be saturated with asphalt. Glass fiber shall conform to the requirements of ASTM D1668.

B. Bonding epoxy shall be Type EP-4 and shall conform to Section 243, Road and Bridge Specifications.

III. MEMBRANE:

Membrane shall conform to one of the following systems:

1. System A - A prefabricated membrane consisting of a laminate formed with suitably plasticized coal tar and reinforced with nonwoven synthetic fibers or glass fibers.

System A:

1. Membrane - The membrane shall be a laminate formed with suitably plasticized coal tar and reinforced with nonwoven synthetic fibers or glass fibers. It shall be a uniformly well manufactured product, free from blemishes, discontinuities or other defects. The membrane shall be supplied in rolls, having a width of 12 inches or other widths as approved by the Engineer, and shall conform to the following requirements:

Thickness (min	65mils	
Pliability: 180 bend over 1" mandrel at 10 F	No cracks	ASTM D146
Softening Point	225 F to 260 F	ASTM D36 Modified
Weight (lbs./sq. ft. min.)	0.45 .	

2. System B - A prefabricated membrane consisting of a laminate formed and rubberized asphalt and reinforced with synthetic fibers or mesh.

System B:

1. Membrane - The membrane shall be laminate of rubberized asphalt and reinforced with synthetic fibers or mesh. It shall be uniformly manufactured, free from blemishes, discontinuities, or other defects. The membrane shall be supplies in rolls having a width of 12 inches or other widths as approved by the Engineer, and shall conform to the following requirements:

Thickness (min.)	65 mils	
Tensile Strength (min.)	50 lb./inch width	ASTM D882, Method A
Puncture Resistance (mesh)	200 lbs.	ASTM D154
Pliability: 180 bend over 1" mandrel at 10 F	No Cracks	ASTM D146
Water Vapor Permeability	0.10	ASTM E96, Method B

3. System C - A prefabricated membrane consisting of a laminate formed with a suitably plasticized asphalt, reinforced with open weave fiber glass mesh, and having a thin polyester top surface film.

System C:

1. Membrane - The membrane shall be a laminate of suitable plasticized asphalt, reinforced with open weave fiber glass mesh, and having a thin polyester top surface film. It shall be uniformly manufactured, free from blemishes, discontinuities, or other defects. The membrane shall be supplied in rolls having a width of 12 inches or other widths as approved by the Engineer, and shall conform to the following requirements:

Thickness (min.)	60 +/- 5 mils	.
Pliability: 180 bend over 1" mandrel at 10 F.	No Cracks	ASTM D146
Softening Point	240 F. Minimum	ASTM D36 Modified
Needle Penetration 5 sec. at 100 g	40 to 50 at 77 F.	ASTM D5

Weight per square yard 2.6 to 3.2 lbs.

IV. PROCEDURE

Cleaning concrete surface and application of bonding epoxy and membrane shall be accomplished as noted on Contract Drawings.

V. MEASUREMENT AND PAYMENT

No measurement will be required for Waterproofing Fabric; the cost shall be included in the price bid for Concrete Class A3 or A4 as denoted on Contract Drawings.

SECTION V
SPECIAL PROVISION IV

WATERPROOFING - CLASS III

PART I GENERAL

DESCRIPTION:

This work shall consist of furnishing necessary labor, tools, materials, equipment and incidentals to treat concrete surfaces with a waterproofing solution, including surface preparation, and application as shown on the Contract Drawings, and in accordance with this section. The color of the coating shall be clear. Material shall hereafter be called Penetrant Sealer.

The areas to be treated are as follows:

1. Top surface of decks.
2. Top surface of sidewalks& parapets on bridge.
3. Faces of curbs on deck.
4. Inside Faces of parapets on deck.

Material shall not be placed until all deck grooving operations are complete.

PART 2 PRODUCTS

2.01

(a) General: The Penetrant Sealer shall be an approved non-epoxy resin material having met the following performance criteria based on a single application of the solution in accordance with the manufacturer's recommended rate of coverage. The Penetrant Sealer shall contain approximately 30% solids by weight.

The Penetrant Sealer shall not stain, discolor, or darken concrete.
Application of the solution shall not alter the surface texture or form a coating on concrete surfaces. Treated concrete shall be surface dry within 30 minutes after application. There shall be no significant change in wet traction characteristics as tested in accordance with AASHTO E-303.

(b) Test of Treated Concrete Specimens:

l- Absorption

Penetrant Sealer shall pass NCHRP 244 test criteria for Series II (cube test) with a weight gain of 13% (maximum) and an absorbed chloride content of 15% (maximum) and for Series IV (Southern Exposure) with a chloride content of 4.0% (maximum).

2- Chloride Ion Penetration

When tested in accordance with AASHTO Designation T 259-80l Non-Abrasion, Resistance of Chloride Ion Penetration, it shall show a 90% (minimum) reduction in chloride ion at the l/2-inch depth and a 90% (minimum) reduction in chloride ion at the l-inch depth compared to the untreated concrete.

3- Treatment

Test	Minimum Depth
Penetration	0.l2 inch

4- Scaling Resistance

ASTM C672-76 (No scaling after 65 cycles)

The material must improve durability of non-air entrained concrete. Treated non-air entrained concrete shall pass ASTM C672 scaling resistance test with a rating not exceeding 1 after 50 cycles as compared to untreated non-air entrained concrete with a rating of 5 after 50 cycles.

5- Vapor Permeability

Penetrant Sealer shall have a Moisture Vapor Transmission Rate per ASTM D1653-72 of 33.0 (minimum) grams per square foot per 24 hours at 75 degrees F.

6- Flash Point

Penetrant Sealer shall have a flash point in excess of 90 degrees F when tested per ASTM D3278-73.

(c) Certification

A certification shall accompany samples of new materials or products submitted to the ENGINEER for approval. This certification shall be prepared by the manufacturer and shall consist of a certified copy of a report covering tests conducted by an approved laboratory. Such tests shall have been conducted on samples obtained from the lot or lots of material in the shipment.

The manufacturer's recommended rate of coverage for the treatment solution as approved for use under these Special Provisions shall be included with this certification.

PART 3 EXECUTION

3.01 DELIVERY, STORAGE, AND HANDLING:

The material shall be delivered to the job in the manufacturer's sealed containers clearly marked with the manufacturer's identifications, including type of material and lot number and with the manufacturer's numbered seals intact.

Store materials in a covered area protected from rain or standing water, where temperatures are not less than 0 degrees F or more than l20 degrees F, with adequate ventilation and away from any source of ignition such as sparks, open flames, etc.

3.02 EQUIPMENT:

(a) General

All necessary equipment shall be furnished by the CONTRACTOR. Minimum requirements for construction equipment required for surface preparation and application of the penetrating water repellent treatment solution are specified herein.

(b) Surface Preparation Equipment

Deck and sidewalk surfaces shall be cleaned using shot blast equipment such as Blas Trac, Wheelabrator Frye, or Turbo Blast, Turbo Blast Company. The size and type of equipment shall be selected based on the job conditions. The size of the shot and travel speed of the equipment shall be selected to provide a uniformly clean surface with a uniform profile acceptable to the ENGINEER.

All surfaces including the deck surface next to curbs, curbs, sidewalks, and parapets which are not cleaned by the shot blast equipment, shall be cleaned by blasting.

(c) Application Equipment

The penetrant sealer shall be applied using low pressure l5-40 psi application pressure. The nozzle shall deliver a minimum of 0.4 gpm with a fan angle of 50 degrees - 65 degrees.

3.03 CONSTRUCTION METHODS:

(a) General

Concrete surfaces shall be cleaned using equipment specified in 3.02 (b) above.

(b) Surface Preparation

All concrete surfaces prepared for treatment shall be thoroughly cleaned prior to application of the penetrant sealer. The method of cleaning shall remove all traces of curing compound, laitance, grease, dirt, dust, salt, oil, asphalt, paint stripes, coating, or other foreign materials to the satisfaction of the ENGINEER.

The cleaning process shall not cause any undue damage to the concrete surface. The method of cleaning shall be performed in such a manner as to provide a reasonably uniform appearing surface color.

On new concrete the degree of blasting shall be light - sufficient to expose fine aggregate with occasional exposure of coarse aggregate, and to make color uniform - maximum reveal 1/16 inch.

On old concrete the degree of blasting shall be medium - sufficient to generally expose coarse aggregate with slight reveal - maximum reveal 1/4 inch.

Concrete surfaces prepared for treatment shall be approved by the ENGINEER.

After the ENGINEER approves the visual appearance of the cleaned concrete surface and prior to placing the Penetrant Sealer on a lane span, the ENGINEER will use the test method prescribed in ACI 503R - Appendix A of the ACI Manual of Concrete Practice to determine if the surface is sufficiently clean to provide a tensile bond strength greater than or equal to 250 psi or a failure area, at a depth of l/4 inch or more into the base concrete, greater than 50% of the test area. The ENGINEER will determine the test area(s) on each lane span. If a test fails, the ENGINEER may conduct a second test without additional cleaning. If the second test fails, the CONTRACTOR shall reclean the failed lane span until a satisfactory test result is obtained. If prior to placing the Penetrant Sealer, traffic must be placed on a lane span that has a passing test result, the lane span must be cleaned again. If the Penetrant Sealer is not placed within seven days of the passing test result, the span shall be cleaned and tested again to demonstrate that the surface is sufficiently clean.

(c) Weather Limitations:

The Penetrant Sealer shall not be applied when the sealer, air or concrete surface temperature is less than 50 degrees F or above 90 degrees F or otherwise below or above the manufacturer's recommended application temperature range. The solution shall not be sprayed when blowing winds or other conditions prevent proper application. Concrete surface shall be dry and shall have been dry for a minimum of 72 hours before application. Material shall not be applied if rain is expected within two (2) hours following application.

(d) Application:

Penetrant Sealer shall be used as supplied by the manufacturer and not diluted or altered in any way. The solution shall be sprayed onto concrete surfaces using equipment specified in 3.02 (c) above, at an approximate rate of 125 square feet per gallon. It shall then be broomed into the concrete surfaces (to break surface tension and increase penetration).

Surface treatment of new concrete prior to 28 days curing will not be permitted.

The CONTRACTOR shall provide, install, and maintain suitable traps, tarps, and/or drop cloths to protect against damage caused by spillage or heavy overspray. Protect all plants and vegetation from overspray. Protect all asphalt-containing material from overspray.

A flood application of the material is required. On horizontal surfaces, the liquid shall pond on the surface at least 5 seconds before being absorbed. On vertical surfaces, the liquid material shall run down 4-6 inches below the spray pattern. The CONTRACTOR shall be required to apply the material as described and shall be responsible for confirming the estimated coverage rate herein.

The CONTRACTOR shall provide adequate ventilation during the application and shall follow all safety precautions stated by the manufacturer.

(e) Traffic:

Traffic shall be kept off treated surfaces until the solution has completely penetrated and is surface dry.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT

Waterproofing Class III shall be measured by the square yard of treated concrete surface area.

4.02 BASIS OF PAYMENT

The accepted quantities of Waterproofing, Class III will be paid for at the unit price bid per square yard which price shall be full compensation for surface preparation and for furnishing all material, equipment, labor, tools, and incidentals necessary for the satisfactory completion of the work.

Payment will be made under:

Pay Item	Pay Unit
"Waterproofing - Class III"	Square Yard

END OF SECTION

SECTION 5

SPECIAL PROVISION V

ARMATEC 110 BONDING EPOXY

PART 1 - GENERAL

1.01 Work Included

A. Furnish all materials, labor, tools, and equipment to bond plastic cement mortar/concrete to hardened hydraulic cement mortar/concrete as designated by the Owner or required by Contract Drawings and these Special Provisions.

1.02 Related Work

A. Hydraulic cement mortar/concrete placement

B. Crack repairs

1.03 Quality Assurance

A. Manufacturer shall provide a well trained technical field representative to direct the Contractor's work. This individual shall be at the project site for a minimum of two days at the beginning of this installation.

B. Provide a notarized certificate stating that the epoxy resin adhesive meets the specified requirements and have the manufacturer's current printed literature on the specified product.

1.04 Delivery, Storage and Handling

A. Deliver the specified product in original, unopened containers with the manufacturer's name, labels, product identification and batch numbers.

B. Store and condition the specified product as recommended by the manufacturer.

1.05 Job Conditions

A. Environmental Conditions: Do not apply material if it is raining or snowing or if they appear to be imminent. Do not apply material if air or surface temperature is below 45 degrees F or is expected to fall below 40 degrees F before new concrete is placed.

B. Protection: Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the epoxy resin adhesive.

PART 2 - PRODUCERS

2.01 Acceptable Manufacturers

A. Sika Armatec 110, as manufactured by Sika Corporation, Lyndhurst, New Jersey, is considered to conform to the requirements of this specification and has performed satisfactorily for bonding plastic hydraulic cement mortar/concrete to hardened hydraulic cement mortar/concrete.

B. Substitutions: The use of other than the specified product will be considered providing the Contractor requests its use in writing to the Engineer. This request shall be accompanied by (a) A certificate of compliance from an approved independent testing laboratory that the proposed substitute product meets or exceeds the specified performance criteria, tested in accordance with the specified test standards; and (b) Documented proof that the proposed substitute product has a five-year proven record of performance of bonding plastic hydraulic cement mortar/concrete to hardened hydraulic cement mortar/concrete, confirmed by actual field tests and five successful installations that the Engineer can investigate.

2.02 Performance Criteria

A. Properties of the mixed epoxy resin/hydraulic cement adhesive.

1. Pot Life: 75-105 minutes

2. Contact Time: 24 hours

3. Color: concrete gray

B. Properties of the cured epoxy resin/hydraulic cement adhesive.

1. Compressive Strength (ASTM C-109)

a. 1 day: 810 psi min.
b. 7 day: 6,200 psi min.
c. 28 day: 8,700 psi min.

2. Splitting Tensile Strength (ASTM C-496)

a. 28 days: 540 psi min.

3. Flexural Strength (ASTM C-348)

a. 1,100 psi min.

4. Bond Strength (ASTM C-882 modified) at 14 days

a. 0 hrs. open time: 2,500 psi min.
b. 24 hrs. open time: 1,700 psi min. (Independent Test Lab Reports Required)

5. The epoxy resin/hydraulic cement adhesive shall not produce a vapor barrier.

Note: Tests above shall be performed with material and curing conditions at 71-75 degrees F and 45-55% relative humidity.

2.03 Materials

A. Epoxy resin/hydraulic cement adhesive:

1. Component "A" shall be an epoxy resin/water emulsion containing suitable viscosity control agents. It shall not contain butyl glycidyl ether.

2. Component "B" shall be primarily a water solution of a polyamine.

3. Component "C" shall be a blend of selected hydraulic cements and sands.

4. The material shall not contain asbestos.

PART 3 - EXECUTION

3.01 Surface Preparation

A. Concrete surface must be clean and sound. Substrate may be dry or damp, but free of standing water and frost. Remove dust, laitance, grease, curing compounds, waxes, impregnations, foreign particles, coatings, and disintegrated materials by mechanical means, i.e. - sandblasting, high-pressure waterblasting, etc., as approved by the Engineer.

B. Cracks in the substrate in the area of the patching or overlay work must be treated as directed by the Engineer.

C. Extend all existing control and expansion joints through any patch or overlay. Install new joints as directed by the Engineer. Fill all joints as directed by the Engineer.

D. Supply and place hydraulic cement mortar/concrete as directed by the Engineer. Mix designs must be pre-approved by the Engineer.

3.02 Mixing and Application

A. Mixing the epoxy resin: Shake contents of Components "A" and Component "B." Empty all of both components into a clean, dry mixing pail. Mix thoroughly for 30 seconds with a jiffy paddle on a low-speed (400-600 rpm) drill. Slowly add the entire contents of Component "C" while continuing to mix for 3 minutes until uniform with no lumps. Mix only that quantity that can be applied within its pot life.

B. Placement procedure:

1. Apply to approved prepared surface with a stiff-bristle brush, broom or "hopper type" spray equipment.

a. For hand applications - Place fresh, plastic concrete/mortar while the bonding bridge adhesive is wet or dry, up to 24 hours.

b. For machine applications - Allow the bonding bridge adhesive to dry for 12 hours minimum.

Note: for polymer-modified mortars/concretes, it is necessary, when the adhesive has dried, to pre-saturate the substrate and scrub coat the repair material into the surface.

C. Adhere to all limitations and cautions for the epoxy resin/hydraulic cement adhesive in the manufacturer's current printed literature.

3.03 Cleaning

A. The uncured epoxy resin/hydraulic cement adhesive can be cleaned from tools with water. The cured epoxy resin/hydraulic cement adhesive can only be removed mechanically.

B. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

PART 4 - COMPENSATION

4.01 Method of Measurement:

No measurement will be required for Armatec 110 Bonding Epoxy; the costs shall be included in the associated concrete bid items.

4.02 Basis of Payment:

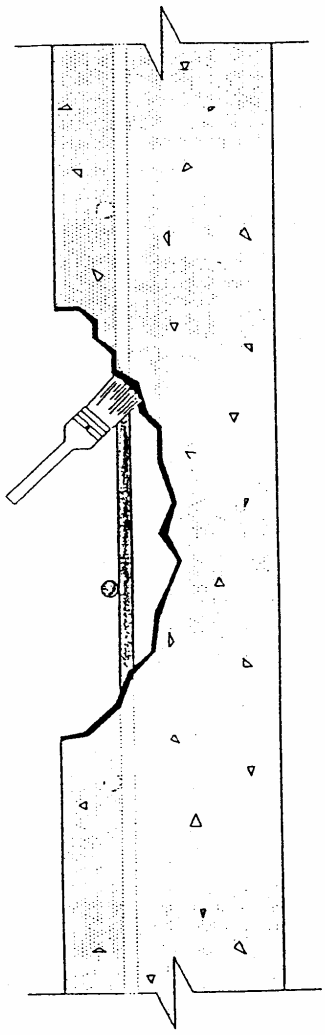
Armatec 110 Bonding Epoxy is not a pay item. It shall be paid for in associated concrete bid items.

BONDING EPOXY

1. PRE-WET SURFACE (KEEP WET MIN. OF 3 HOURS) TO SATURATED SURFACE DRY (SSD).

2. APPLY 50 SQ. FT. PER GAL. TO CONCRETE AND 50 SQ. FT. PER GAL. TO REBAR SURFACE AREA BY STIFF BRISTLE BRUSH OR SPRAY APPLY WITH "GOLDBLATT PATTERN PISTOL" OR EQUAL EQUIPMENT.

3. PLACE REPAIR MATERIAL WHILE SIKA ARMATEC 110 IS STILL WET OR DRY UP TO 24 HOURS.



THIS SECTION OMITTED FOR PAGES V-18 – V-21

SPECIAL PROVISION VII
SHOTCRETE- CLASS B

In addition to the requirements of Section 412 of the Virginia Department of Transportation Road and Bridge Specifications, the following shall apply:

1. Inspection. Because of the importance of workmanship effecting the quality of the shotcrete, continual inspection during placement will be maintained. After the shotcrete has obtained sufficient strength to withstand hammering, it will be sounded by the Engineer in an effort to locate sand pockets and/or other unsound areas. Any imperfections discovered shall be cut out and replaced with sound material as directed by the Engineer at the Contractor's expense.

2. Construction Testing. The Contractor shall make one (1) test panel with minimum dimensions of 18" x 18" x 4" gunned in the same position as the work represented for every 50 cubic yards of shotcrete placed but at least one (1) panel per shift. Panels shall be gunned during the course of the work by the Contractor's regular nozzleman. Field cure panels in the same manner as the work, except that the test specimens shall be soaked in water for a minimum of 40 hours prior to testing. An independent testing lab will cut three (3) 3" diameter cores from each panel for testing.

   When the length of a core is less than twice the diameter, apply the correction factors given in the ASTM C42 to obtain the compressive strength of individual cores.

   The average compressive strength of three (3) cores taken from the test panel representing a shift of 50 cubic yards of shotcrete, must equal or exceed 0.85f'c with no individual core less than 0.75f'c.

   As an alternate to the usage of test panels, the Engineer may require the Contractor to make a minimum of four (per shift) acceptable 4" diameter x 8" length cylinders for testing. These cylinders shall be made at the Contractor's expense.

   Final acceptance of the shotcrete will be based on the results obtained from cores or cylinders, visual inspection, and hammering with masonry hammer. Use of data obtained from impact hammers, ultra-sonic equipment, or other non-destructive testing devices will not be permitted for final acceptance of the shotcrete; however, these data may be useful for determining uniformity of the shotcrete.

SPECIAL PROVISION VIII

SUBSTRUCTURE CONCRETE REPAIR

A. GENERAL

This item consists of blasting concrete and reinforcing steel, forming and placing A4 concrete and bonding epoxy on existing concrete and reinforcing steel, curing concrete and removal of forms, all in accordance with the Contract Drawings and these Special Provisions.

B. OTHER ITEMS TO BE CONSIDERED DURING SUBSTRUCTURE CONCRETE REPAIR

1. Substructure concrete repair under the beams for each respective stage shall be complete before casting deck in that stage of construction. Substructure concrete repair (for each respective stage) shall be complete and concrete shall have obtained a minimum compressive strength of 4,000 psi before placement of deck concrete.

C. METHOD OF MEASUREMENT

Substructure Concrete Repair will be measured on a square footage basis for the original surface area of substructure actually repaired.

D. BASIS OF PAYMENT

The unit price shown in the contract for "Substructure Concrete Repair" shall be full compensation for blasting exposed reinforcing steel and faces of existing concrete the new concrete will bond to, placing Bonding Epoxy and concrete, replacing all concrete, joint filler and joint sealer material removed to gain access, removing & replacing all riprap and excavation necessary to gain access, forming, curing concrete, removal of forms, and for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work. Payment will be made under the contract pay item of:

1. "Substructure Concrete Repair" and the pay unit will be on a "square foot" basis for the area actually repaired.

SECTION V

SPECIAL PROVISION IX

REPAIR RIPRAP

A. GENERAL

This item consists of sandblasting the repair area and removing all loose material in the repair area prior to pre-wetting and placing of Shotcrete -Class B in the repair area in accordance with the Contract Drawings and these Special Provisions.

B. METHOD OF MEASUREMENT

"Repair Riprap" will be measured on a "Lump Sum" basis, wherein no measurement will be made.

C. BASIS OF PAYMENT

The contract price for "Repair Riprap" shall be full compensation for sandblasting, removing loose material, furnishing and placing and curing Shotcrete - Class B and the furnishing of all materials, labor, tools, equipment and incidentals necessary to complete the work. Payment will be made under the contract pay item of "Repair Riprap", and the pay unit will be on a "Lump Sum" basis.

SPECIAL PROVISION X

ENCASE CAPS

A. GENERAL

This item consists of blasting concrete and reinforcing steel, forming and placing A4 concrete and bonding epoxy on existing concrete and reinforcing steel, curing concrete and removal of forms, all in accordance with the Contract Drawings and these Special Provisions.

B. OTHER ITEMS TO BE CONSIDERED DURING "ENCASE CAPS"

1. "Encase Caps" under the beams for each respective stage shall be complete before casting deck in that stage of construction. "Encase Caps" (for each respective stage) shall be complete and concrete shall have obtained a minimum compressive strength of 4,000 psi before placement of deck concrete.

C. METHOD OF MEASUREMENT

Encase Caps will be measured on a linear foot basis for the length of caps actually encased.

D. BASIS OF PAYMENT

The unit price shown in the contract for "Encase Caps" shall be full compensation for blasting exposed reinforcing steel and faces of existing concrete the new concrete will bond to, placing Bonding Epoxy and concrete, forming, curing concrete, removal of forms, and for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work. Payment will be made under the contract pay item of:

1. "Encase Caps" and the pay unit will be on a "linear foot" basis for the length of original cap actually encased.

SPECIAL PROVISION XI

SURFACE PREPARATION CLASS IV

A. GENERAL

This item shall consist of removing and disposing of the existing substructure concrete as outlined on the Contract Drawings and required by these Special Provisions, in locations selected by the Engineer. This item shall include the removal of existing concrete that is deteriorated or contaminated, as well as concrete surrounding corroded reinforcing steel. In all repair areas the existing concrete shall also be removed to a minimum depth of 1" clear behind the reinforcing steel.

B. METHOD OF MEASUREMENT

Surface Preparation Class IV will be measured on a square footage basis for the original surface area of substructure actually removed.

C. BASIS OF PAYMENT

The unit price shown in the contract for "Surface Preparation Class IV" shall be full compensation for removal and disposal of existing concrete in repairs, and for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work. Payment will be made under the contract pay item of:

"Surface Preparation Class IV," and the pay unit will be on a "square foot" basis for the original surface area actually removed.

SECTION V

SPECIAL PROVISION XII Rev. 1-02-04

BEARING REPLACEMENT

A. GENERAL

This item shall consist of removing existing elastomeric bearing pads and sole plates, furnishing & placing new stub stiffeners, new sole plates, elastomeric bearing pads and coating underside of sole plates with epoxy grit in accordance with Specifications, Section 408.03, all in accordance with the Contract Drawings and these Special Provisions.

B. OTHER ITEMS TO BE CONSIDERED DURING BEARING REPLACEMENT:

1. Bearing replacements under Beam #4 through #6 shall be complete before casting of deck in Stage 1 construction. Bearing replacements under Beams #1 through #3 shall be complete prior to casting deck in Stage 2.

2. Anchor Bolt Replacement shall be accomplished during the phase of work for Encase Caps or Abutment Concrete Placement. See separate Special Provisions for these bid items.

6. Tighten anchor bolt nuts to finger tight condition after bearing replacement is complete.

C. METHOD OF MEASUREMENT

Bearing Replacement will be measured as one bearing replacement per bearing actually replaced.

D. BASIS OF PAYMENT

The unit price shown in the contract for this item shall be full compensation for loosening nuts, cutting and removing existing sole plates & elastomeric bearings, blasting and applying epoxy and grit to underside of new sole plates, furnishing and installing new stub stiffeners & new sole plates & laminated elastomeric bearing pads, and the furnishing of all materials, labor, tools, equipment and incidentals necessary to complete the work. Payment will be made under the contract pay item of "Bearing Replacement," and the pay unit will be an "each" basis per bearing actually replaced.

SPECIAL PROVISION XIII

ENCASE STEMS

A. GENERAL

This item shall consist of blasting concrete and reinforcing steel, forming, and placing A4 concrete and bonding epoxy on existing concrete and reinforcing steel, curing concrete, removal of forms, all in accordance with the Contract Drawings and these Special Provisions.

B. METHOD OF MEASUREMENT

Encase Stems will be measured on a linear foot basis for the vertical height of stems actually encased.

C. BASIS OF PAYMENT

The unit price shown in the contract for Encase Stems shall be full compensation for blasting exposed reinforcing steel and faces of existing concrete the new concrete will bond to, placing Bonding Epoxy and concrete, forming, curing concrete, removal of forms, and for furnishing all materials, Labor, tools, equipment and incidentals necessary to complete the work. Payment will be made under the contract pay item of:

1. “Encase Stems” and the pay unit will be on a “linear foot” basis for the vertical height actually encased.

SPECIAL PROVISION XIV

REPLACE ANCHOR BOLTS

A. GENERAL

This item shall consist of replacing anchor bolts in the existing bearing assemblies. Concrete shall be removed as detailed on drawings & anchor bolts shall be removed and replaced with new 1 1/4" diameter swedged anchor bolts and cast in place with Class A4 Concrete. Holes shall be blasted and blown clean with oil-free air prior to anchor bolt installation. All work shall be done in accordance with Contract Drawings and these Special Provisions.

B. METHOD OF MEASUREMENT

Replace Anchor Bolts will be measured as one (1) bolt per bolt actually replaced.

C. BASIS OF PAYMENT

The unit price shown in the contract for "Replace Anchor Bolts" shall be full compensation for removing and disposing of existing anchor bolts and nuts, removing existing concrete around anchor bolts and furnishing and installing new anchor bolts and nuts, which shall include blasting bolt hole, blowing hole clean, placing new concrete, epoxy bonded around the new bolts and for furnishing all materials, labor, tools, equipment, and incidentals necessary to complete the work. Payment will be made under the contract pay item of "Replace Anchor Bolts," and the pay unit will be on an "each" basis per anchor bolt actually replaced.

SPECIAL PROVISION XV

REPLACE WATERLINE SUPPORTS

A. GENERAL

This item shall consist of placement of new waterline struts and hanger assemblies, temporarily supporting existing waterline while removing and disposing of existing waterline U-bolts & placement of new roller system on existing support struts & adjustments to existing waterline support system all in accordance with Contract Drawings and these Special Provisions.

B. METHOD OF MEASUREMENT

"Replace Waterline Supports" will be paid for on a "Lump Sum" basis, wherein no measurement will be made.

C. BASIS OF PAYMENT

The contract price for “Replace Waterline Supports” shall be full compensation for drilling and reaming holes in existing beam webs, furnishing and installing 3/4” diameter high strength bolts, nuts and washers, 6”x4”x1/2” support angle, hangers, rollers, rods and miscellaneous hardware for new waterline supports and temporarily supporting existing waterline while furnishing and installing hangers, rollers, rods and miscellaneous hardware for replacing existing waterline U-bolts, and adjusting elevation of hangers during temporary jacking of superstructure. Such price shall be full compensation for the furnishing of all materials, labor, tools, equipment and incidentals necessary to complete the work. Payment will be made under the contract pay item of “Replace Waterline Supports” and the pay unit will be on a “Lump Sum” basis.

REMOVE PORTION OF EXISTING STRUCTURE

A. GENERAL

Remove portion of Existing Structure shall meet all requirements of Section 413 of the VDOT Road & Bridge Specifications and these Special Provisions and the Contract Drawings.

The portion of the bridge to be removed and disposed of includes all of the existing deck, curbs, sidewalks, deck drainage systems, parapets and railing system of the superstructure.

The existing railings and rail posts will remain the property of the City of Lynchburg and upon the completion of the project are to be delivered by the Contractor to the Public Works Department Storage yard located at the Graves Mill Road- Rte 501 interchange.

The Contractor shall take adequate precautions, including the placement of forms between beams, to prevent material from falling onto the stream.

The cost of "Remove Portion of Existing Structure" shall include the removal and delivery of the existing railings and posts from this bridge to the City storage yard.

SPECIAL PROVISION XVII

SANDBLASTING SAND

A. GENERAL

All sand used in cleaning or sandblasting operations shall be a type that will create a minimum amount of dust. It shall also be sharp, coarse and hard so that it will cut quickly.

All sand shall, as a minimum, meet the following gradation:

Sieve Size	Percent Passing Sieve, by Weight
20	63 Max.
30	9 Max.
40	0.8 Max.
50	0.1 Max.
70	0 Max.

B. METHOD OF MEASUREMENT

Sandblasting sand will not be measured as a separate pay item.

C. BASIS OF PAYMENT

The cost of sandblasting sand and all costs associated with it shall be included in the Contract price of other items bid.

SPECIAL PROVISION XVIII
ADHESIVE ANCHORS

PART 1 GENERAL

1.01 DESCRIPTION

A. This item consists of drilling holes in existing concrete, cleaning holes, placing reinforcing steel in holes and anchoring reinforcing steel with anchoring material, all in accordance with the Contract Drawings and these Special Provisions.

1.02 QUALITY ASSURANCE

A. The Contractor shall provide a notarized certification stating that the material meets the specified requirements.

B. The Contractor shall proof load a minimum of 10% of the in-place adhesive anchors at random locations as selected by the Engineer. These anchors must be proof loaded to 90% of the yield of the reinforcing steel as shown in the table in this Special Provision. At 90% of the yield of the reinforcing bar, there shall be no indication of damage to the concrete or pullout of the reinforcing bar. These pullouts can be proven by:

1. Unrestrained tests (ASTM E 488) with hydraulic equipment having calibrated jacks.

2. Direct tension pulls with hydraulic equipment with calibrated gages.

PART 2 PRODUCTS

2.01 MATERIALS

A. The steel shall be epoxy coated reinforcing steel meeting requirements of ASTM A615 Grade 60 of the size specified on the Drawings.

B. The anchoring material shall be a polyester resin (made in USA) with no weakening additives or fillers.

2.02 ACCEPTABLE MANUFACTURERS

A. Anchoring Material - KELIBOND SYSTEM as manufactured by Kelken-Gold, Incorporated, South Plain Field, New Jersey, is considered to conform to the requirements of this specification.

B. Substitutions: The use of other than the specified products will be considered providing the Contractor requests their use in writing to the Engineer. This request shall be accompanied by (a) a notarized certificate of compliance from an approved independent testing laboratory stating that the proposed substitute products meet or exceed the specified performance criteria, tested in accordance with the specified test standards of the acceptable manufacturer listed and (b) tests reports from independent testing laboratory giving data proving to the satisfaction of the Engineer the system is capable of achieving minimum yield strength of embedment steel.

C. The anchoring material shall have the following properties:

Compressive Strength	(ASTM D695)	17,000 psi
Tensile Strength	(ASTM D638)	5,510 psi
Tensile Modulus	(ASTM D638)	1.14 x 106psi
Flexural Modulus	(ASTM D790)	1.06 x 106psi

Temperature Range During Installation - 10 degrees F. to 110 F.

2.03 PHYSICAL PROPERTIES:

REINFORCING BAR DIAMETER (1/8")	90% OF YIELD OF REINFORCING BAR (LBS.)
4	10,800
5	16,740
6	23,760
7	32,400
8	42,660
9	54,000
10	68,580
1 1/4” Ø Cont. coil threaded rod	45,000lbs

PART 3 EXECUTION

3.01 APPLICATION

A. Basic steps for Adhesive Anchors are:

1. Clean the area around the hole to be drilled.

2. Drill hole in concrete to required depth.

a. Extreme caution shall be taken in order that existing reinforcing steel is not damaged. Any reinforcing steel damaged shall be corrected at Contractor's expense.

b. Holes shall be drilled with air drills using hollow drill bits.

c. The holes shall be blown clean during drilling with air blown through the hollow bits.

d. The holes shall be horned out by use of a stiff mechanics or metal bristle brush in order to add roughness to the sidewalls.

e. At the completion of drilling and after drill is removed, full penetration air "blowout" & vacuuming shall be used to perform the final "clean-out" of hole.

3. Mixing anchoring Material and Placement of Reinforcement Steel:

a. Pour hardening powder from its container into resin. Hand mix by stirring vigorously for 60 seconds. Then pour into the bottom half of several clean, drilled holes. The holes may be damp but may not have running or standing water present.

b. The anchors are pushed to the bottom of the holes and rotated to be sure of total "wetting".

c. If horizontal hole is used, use polypropylene disposable gun that will reach to base of hole in order to insert anchoring material. For horizontal holes across cut stoppers shall also be used to prevent loss of anchoring material.

d. They are left undisturbed until gel occurs, which happens within minutes to approximately one hour depending on the temperature at the time of installation.

e. After the material has cooled, it will have 50 to 60 percent of its ultimate strength.

f. Anchor shall be left, undisturbed, for a min. of 24 hours before testing anchor..

B. Make sure that all material is installed using manufacturer's recommended equipment and in strict accordance with manufacturer's recommendations.

PART 4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT

A. No measurement shall be required for "Adhesive Anchors" as the quantity shall be paid for in the concrete bit items in which it is used.

4.02 BASIS OF PAYMENT

A. "Adhesive Anchors" - shall be paid for in other bid items and shall not be measured as a pay item.

SECTION V

SPECIAL PROVISION XIX

JACKING AND BLOCKING SUPERSTRUCTURE

A. GENERAL

The Contractor shall provide the Engineer with a workable plan for jacking and supporting the existing beams during "Jacking and Blocking Superstructure." The Contractor shall submit drawings and structural calculations (stamped by a Virginia Registered Professional Engineer) to the Engineer, for review, giving all details of the proposed method of Jacking and Blocking the structural steel.

This item consists of placing temporary plywood ramps adjacent to Abutment A & B backwall during jacking operation, simultaneously jacking and blocking all 6 beam ends at Abutments and all 12 beam ends at piers (jack at one substructure unit at a time). This item also consists of placing temporary steel plate shims (2 -1 1/2"x 8"x 13" for span a & c and 2-1 1/2"x 8"x 17" for span b) under all bearings, lowering beams back down and removing the jacking and blocking system, all in accordance with the Contract Drawings and these Special Provisions.

B. OTHER ITEMS TO BE CONSIDERED DURING JACKING AND BLOCKING SUPERSTRUCTURE

1. Note that all 6 ends of beams at Abutments shall be jacked and supported simultaneously and all 12 ends of beams at piers shall be jacked and supported simultaneously.

2. Special care shall be taken during jacking operations to prevent damage to existing waterline and support system. Roller supports shall be kept snug at all times.

3. Beams shall be raised a maximum of approximately 3 1/2" by jacking simultaneously unless otherwise directed by the Engineer. At all times, the beams being raised or lowered shall be kept within 1/4" (measured at each bearing) of each other.

4. All timber used shall be of a good grade of sound oak, free of splits and flat on each side. Timber shall be sized, at Contractors expense, as necessary to meet field conditions.

5. In no case shall the Contractor leave Piers or Abutments with beams supported fully or partially by jacks.

6. All jacks used shall have a lock nut feature.

7. During jacking operations, traffic may be stopped for a maximum period of 5 minutes between 9:00 am and 3:00 pm only. Traffic stoppage will not be allowed at other times.

8. Superstructure directly above pier stem encasement and pier cap encasement and abutment seat repairs shall be supported directly from the ground or pier footings prior to removal of existing substructure concrete and until the new concrete is placed and reaches full strength.

9. The item “Jacking and Blocking Superstructure” covers all raising and lowering of beams necessary to complete this project.

10. Beams shall be within 1/8” of their final position when the pier cap encasement is completed.

C. METHOD OF MEASUREMENT

Jacking and Blocking Superstructure will be paid for on a “Lump Sum” basis.

D. BASIS OF PAYMENT

The Lump Sum price shown in the contract for this item shall be full compensation for providing drawings and calculations for proposed methods of jacking and supporting structural steel, as well as furnishing and installing such supports, performing the jacking operation, placing shims under beams, placing temporary plywood ramps adjacent to Abutments, lowering beams, removing the jacking and support system and the furnishing of all materials, labor, tools, equipment and incidentals necessary to complete the work. Payment will be made under the contract pay item of “Jacking and Blocking Superstructure,” and the pay unit will be “Lump Sum.”